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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/492,246	01/27/2000	Anna Lee Y. Tonkovich	E-1666B CIP	9623

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EXAMINER
STRICKLAND, JONAS N

ART UNIT	PAPER NUMBER
1754	15

DATE MAILED: 01/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/492,246	TONKOVICH ET AL.	
	Examiner	Art Unit	
	Jonas N Strickland	1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 November 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,5-9,11-21 and 24-48* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,5-9,11-21 and 24-48* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. This Office Action is in response to the amendment filed on11/4/02 as Paper No. 14. Claims 22 and 23 have been cancelled. Claims 7, 14, 28, 32, 33, 37, and 45 have been amended. Claims 47 and 48 are newly added claims. Claims 1, 5-9, 11-21, and 24-48 are pending.

Allowable Subject Matter

2. The indicated allowability of claims 14-17, 24, 27-35, 37, and 45 is withdrawn in view of the newly discovered reference(s) to Tonkovich et al. (US Patent 6,488,838 B1), Mulder et al. ("Catalytic Combustion In A Sintered Metal Reactor With Integrated Heat Exchanger") and Tonkovich et al. (US Patent 6,479,428 B1). Rejections based on the newly cited reference(s) follow.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) do not apply to the examination of this application as the application being examined was not (1) filed on or after November 29, 2000, or (2) voluntarily

published under 35 U.S.C. 122(b). Therefore, this application is examined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

4. Claim 48 is rejected under 35 U.S.C. 102(e) as being anticipated by Tonkovich et al. (US Patent 6,488,838 B1).

Tonkovich et al. discloses a chemical reactor and a method for catalytic chemical reactions having gas phase reactants. The chemical reactor has reactor microchannels for flow of at least one reactant and at least one product, and a catalyst material wherein the at least one reactant contacts the catalytic material and reacts to form one product (see abstract). Tonkovich et al. continues to teach having a heat exchanger to transfer heat (col. 5, lines 25-30), as well as maintaining a contact time of the reactant of less than 10 ms (col. 3, lines 59-60). Tonkovich et al. also discloses a porous catalytic material (col. 4, lines 3-5). The porous structure is comprised of metal (col. 4, lines 3-5; col. 5, lines 32-33). It is anticipated that the process disclosed by Tonkovich et al. would inherently suppress slow reactions and reduce the formation of undesirable chemical reaction products.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1, 5-9, 11-13, 18-21, 25, 26, 32, 36, 44, 46, and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tonkovich et al. (US Patent 6,488,838 B1)

and Mulder et al. ("Catalytic Combustion In A Sintered Metal Reactor With Integrated Heat Exchanger").

Applicant claims with respect to instant claims 1, 5-9, 11-13, 18-21, 25, 26, 32, 36, 44, 46, and 47 wherein the step of transferring heat at steady state, transfers at least 0.6 W/cc of the total reactor volume. Tonkovich et al. discloses a process for the catalytic conversion of one reactant in a thermal chemical reaction, utilizing a heat exchanger to transfer heat. Tonkovich et al. teaches wherein the contact time of the reactant with the catalyst is less than 10 ms and wherein the pressure drop through the reaction chamber ranges from 0.1 psi to about 5 psi (see claim 11), which is less than about 15 psig. However, Tonkovich et al. does not disclose wherein the step of transferring heat at steady state, transfers at least 0.6 W/cc of the total reactor volume.

However, Mulder et al. teaches a catalytic combustion process in a reactor with an integrated heat exchanger, wherein the apparatus exhibits a thermal conductivity from about 0.2 to about 3 W/mK (see p. 827).

Therefore, it would have been obvious to one of ordinary skill in the art to modify the teachings of Tonkovich et al., based on the teachings of Mulder et al., by having a thermal chemical reaction, utilizing a heat exchanger and a catalyst with a transfer of heat of at least 0.6 W/cc, because Mulder et al. teaches a thermal chemical reactor, which utilizes a catalyst and a heat exchanger having a thermal conductivity between about 0.2 to about 3 W/mK. Such modification would have been obvious to one of ordinary skill in the art, because one of ordinary skill in the art would expect a process utilizing a catalyst and a heat exchanger in a thermal chemical reaction as taught by

Mulder et al. to be similarly useful and applicable to a thermal chemical reaction process, which also utilizes a catalyst and a heat exchanger as taught by Tonkovich et al. Furthermore, it would have been obvious to one of ordinary skill in the art to expect the process disclosed by Tonkovich et al. to have been able to achieve the desired transfer of heat of the reactor volume of the instant claims and the suppression of undesired reaction products, since Tonkovich et al. discloses the instantly claimed contact time and pressure drop in a process for the catalytic conversion of one reactant in different gas phase reactant catalytic reactions (col. 3, lines 53-60).

7. Claims 14-17, 24, 27-31, 33-35, 37-43, and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tonkovich et al. (US Patent 6,488,838 B1) and Mulder et al. ("Catalytic Combustion In A Sintered Metal Reactor With Integrated Heat Exchanger") as applied to claims 1, 5-9, 11-13, 18-21, 25, 26, 32, 36, 44, 46, and 47 above, and further in view of Tonkovich et al. (US Patent 6,479,428 B1).

Applicant claims with respect to instant claims 14-17, 24, 27-31, 33-35, 37-43, and 45, wherein the catalyst comprises an interfacial layer on a porous support. Tonkovich et al. '838 and Mulder et al. do not disclose wherein the catalyst has an interfacial layer on a porous support.

However, Tonkovich et al. '428 teaches wherein a catalyst has a porous support and an interfacial layer and catalyst layer (see abstract) and wherein the interfacial layer reduces the thermal expansion of the catalyst, if the catalyst is heated to high operating temperatures (see abstract). Therefore, it would have been obvious to one of ordinary skill in the art to expect the catalyst to comprise an interfacial layer on a porous support

as well as to expect the catalyst to comprise an interfacial layer, which has a different thermal coefficient of expansion than the porous support. Tonkovich et al. '428 continues to teach wherein the interfacial layer has a greater surface area as well (col. 1, lines 31-33).

Therefore, it would have been obvious to one of ordinary skill in the art to utilize a catalyst with an interfacial layer in a thermal chemical reaction process, because Tonkovich et al. '428 teaches using an interfacial layer to reduce the thermal expansion of a catalyst operating under high temperatures. Such modification would have been obvious to one of ordinary skill in the art, because one of ordinary skill in the art, would have expected a catalyst, which is used in a thermal chemical reaction as taught by Tonkovich et al. '428 to be similarly useful and applicable to a thermal chemical process, which also utilizes a catalyst has taught by Tonkovich et al. '838 and Mulder et al.

Response to Arguments

8. Applicant's arguments with respect to the instant claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jonas N Strickland whose telephone number is 703-306-5692. The examiner can normally be reached on M-TH. 7:30-5:00, off 1st Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on 703-308-3837. The fax phone

numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-0661.

Jonas N. Strickland
January 10, 2003

Wayne A. Langel
WAYNE A. LANGEL
PRIMARY EXAMINER